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ANNUAL SUMMARY.

VOLUME XXII.

1894.

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Page 104, line 24, for lower "Florida" read "California."

Page 107, table, line 10, for "Cape May" read "Atlantic City;" line 11, for "Cape Hatteras" read "Hatteras;" line 30, for "February" read "March."

Page 111, line 16, for "Augusta, Me.," read "Augusta, Ga."

Page 169, table, District of Columbia, total, for "8" read "3;" Massachusetts, for "9" read "10."

Page 293, Honolulu table, line 6, for "SW." read "S. 50 W.;" line 9, for "5" read "4."

Page 303, table, Tucson, Ariz., for "T" read "P."

Page 316, line 67, for "ridge" read "region."

Page 319, line 2, for "27" read "37."

Page 329, line 9, for "heavy" read "leaves."

Page 363, line 38, for "27" read "37."

Page 442, table, line 58, means, for "17" read "16;" for "657" read "697;" for "27.4" read "29.0."

Page 447, table, transpose the headings of the columns "average" and "total."

Page 507, column 2, table, under "Remarks," omit the line "at about noon, when the actual temperature was —20."

Page 508, column 1, line 11, for "increases as we go" read "may increase."

Page 508, line 3, for "Fr. Francis Chaves" read "Capt. Francisco A. Chaves.

Page 508, column of wet-bulb temperature, add 10° C. to each.

Page 513, 7th line from bottom should read "southwest gales with thunder and heavy rain during the summer season on the west side," etc.

In reply to the inquiries of some correspondents it is necessary to state that the figures given monthly in Table IV*b*, expressing the means of the hourly readings of the self-registering rain gauges, are intended to present data for the study of the diurnal periodicity of rainfall, and are made up from the records of a whole number of complete days; therefore, if any incomplete day is omitted the total monthly rainfall found by summing up the figures on the horizontal line will be less than the total rainfall as independently measured by the observer from the rain gauge. In general, the self-register fails to record amounts less than 0.05 inch, and it is therefore impossible in many cases to accredit these small amounts to the proper hours. The monthly totals given in Table IV*b* are a repetition of those given in Table I and include the small amounts that have thus disappeared from the hourly readings.

In September, 1894, at Jupiter, Fla., the register overflowed, and about 2.40 inches is missing from the hourly record.

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CIRCULAR.

U. S. DEPARTMENT OF AGRICULTURE,
WEATHER BUREAU,
Washington, D. C., January 1, 1894.

The International Meteorological Congress held in Vienna in September, 1873, decided that it was desirable to employ symbols that should be independent of any national language and, therefore, generally intelligible, in order to indicate cloudiness, aqueous meteors, and the special phenomena that are usually recorded. From a study of the symbols and abbreviations then in current use among many nations, the permanent committee devised a system for uniform international use which has been somewhat modified by subsequent congresses, and lastly at Munich, in 1892.

A list of the symbols now recommended by the International Congress, with an explanation of each, will be found on the accompanying reprint of Circular No. 16, 1883. The symbols are especially commended for adoption by *voluntary observers and others* who keep statistical records of one sort or another, but no systematic account of the occurrence of miscellaneous phenomena, such as fog, frost, halos, thunderstorms, etc.

The character of the information to be conveyed by the use of the symbols is illustrated by the following examples: 1 ≤ 9 p—10 p in E; 3 ● 11 p—; 4 ● —10 a., ⌐≤ 3 p—5 p. The translation of the foregoing is as follows: On the 1st sheet lightning was observed from 9 to 10 p. m. in the east; 3d, rain began at 11 p. m. and continued during the night (a dash indicates the continuance of a phenomenon); 4th, rain ended at 10 a. m., and a thunderstorm prevailed from 3 to 5 p. m.

The absence of an exponent (the small figure above and to the right of the symbol) denotes a phenomenon of moderate intensity; the exponent zero (^{0}) slight intensity, as flurries of snow ✳^{0}, sprinkling rain ●^{0}. The exponent two (^{2}) indicates a phenomenon of great intensity, as heavy rain ●^{2}, heavy snow ✳^{2}.

MARK W. HARRINGTON,
Chief of Bureau.

INTERNATIONAL SYMBOLS RECOMMENDED FOR USE.

1. ● RAINFALL—Indicates that an appreciable quantity of rain (one hundredth of an inch or more) has fallen during the day or since the last observation; also, that the day is a rainy day as distinguished from snowy or clear days.
2. ✳ SNOWFALL—Indicates that an appreciable quantity of snow has fallen during the day. ✳° may be used to denote flurries of snow.
3. ▲ HAILSTONES—Hard semi-transparent ice, whether small or large, crystalline or rounded. ▲° small quantity of hailstones; ▲² large quantity of hailstones.
4. △ SLEET—Or pellets of snow or soft hail without any crystalline structure. This symbol is used by the Germans for *Graupeln*, or snow pellets, and for the semi-transparent mixture of snow and ice that in the dry weather of Central Europe nearly corresponds to the sleet of the coasts of England and America. △° small quantity of sleet; △² much sleet.
5. ⋁ SILVER FROST—(English, "silver thaw," French, *givre*, German, *rauhfrost* or *duft-anhang*); this refers to an accumulation of snow and sleet on the limbs of trees, in which the snow is the main feature, so that the external appearance is silvery white and rough.
6. ∽ GLAZED FROST—(French, *verglas*, German, *Glatteis*); this refers to an accumulation of snow and ice on the trees, in which the ice is in excess and the external appearance is smooth and transparent. In using the symbols for "silver frost" and "glazed frost," the Munich Conference requests that these terms be considered as descriptive of the resulting phenomena, no matter how they are brought about, therefore the definitions avoid any statement as to the conditions attending the formation of the depositions. The same rule applies to the use of the symbol for "hoar frost."
7. ← ICE-NEEDLES—(Not yet well defined by international usage).
8. ⊹ DRIFTING SNOW—(German, *schneegestober*); this symbol indicates that strong winds are raising the snow from the ground, filling the air with it like dust, and transporting it horizontally; this may occur under a clear sky. The symbol does not refer to snow falling from the clouds, nor to the mere fact that the snow is lying in drifts on the ground. When the air is filled with blinding snow-dust, use the symbol ⊹², but for light winds and light snow-dust use ⊹°.

9. ⊠ SNOW-COVERING—Or quantity of snow lying on the ground; when more than half the soil in the neighborhood of any station is covered with snow this is indicated by ⊠, if the snow covering is thin, use ⊠⁰, but if it is considered deep for that station use ⊠².

10. ≡ FOG—Enveloping the observer; ≡⁰ thin fog or mist enveloping and above the observer; ≡² heavy fog or mist, such as the Scotch mist, drizzling down upon the observer. Neither of these fog symbols is to be used when an observer at a high station notices fog in the valley below him; such an observation as this should only be expressed by a note in the daily journal.

11. ∞ HIGH HAZE—Such as makes distant mountains appear hazy, or such as covers the sky in the case of Indian summer haze or prairie fires; German, *Moorrauch*. If clouds are also prevalent in connection with this haze, the additional cloud signal should be given. The intensity, or density, of the haze is expressed by ∞⁰ for light haze and ∞² for dense haze. The symbol ∞ indicates merely the hazy condition, or the optical result, without considering whether the haze is caused by dust or moisture.

12. ⌓ DEW; ⌓⁰ LIGHT DEW; ⌓² HEAVY DEW—As the formation of dew depends upon the nature and exposure of the horizontal surface on which dew is deposited, the observer should use the same horizontal object uniformly throughout the season.

13. ⌐ HOAR FROST; ⌐⁰ LIGHT HOAR FROST; ⌐² HEAVY HOAR FROST, injurious to vegetation—The expression "frosty weather" refers to the low temperature as such; but the expression "hoar frost" to the crystalline ice deposited upon the surface of solids in the open air. Hoar frost is deposited on horizontal objects generally under a clear sky at night.

14. ⥵ STRONG WIND—An arrow with four feathers indicates a wind whose strength is 8, 9, 10, 11, or 12 on the Beaufort scale, or 8, 9, or 10, on the international scale, or anything in excess of 50 miles per hour or 20 metres per second in absolute measures; ⥵² a remarkably strong wind or one exceeding 11 on the Beaufort scale, or 80 miles per hour, or 35 metres per second.

15. ⚡ THUNDERSTORM—Namely thunder, whether with or without lightning, rain, hail, or wind.

16. ↯ HEAT LIGHTNING—Distant lightning or any form of lightning that occurs without audible thunder, even when it occurs in the zenith, which is sometimes the case (this latter occurrence should be especially described in the journal of the

observer); ≤° infrequent lightning, or lightning that is confined to a small region of the sky; ≤² lightning that occurs very frequently or extends over a large region of the sky. When distant lightning appears at a definite direction in the horizon, the observer should add the letters indicating the points of the compass, for instance, ≤° NW. 10 p. indicates that occasional heat lightning occurred in the distant northwest at ten p. m.

17. ⊙ SOLAR AUREOLA, CORONA, or GLORY—German, *Kranz*, *Lichtkron*, "Corona," *Sonnenhof*. These are small circles of prismatic colors surrounding the sun, the radii of these circles are usually less than six degrees, but in the extreme case of Bishop's ring, its radius was fifteen degrees. Several concentric circles are sometimes visible; each circular band of prismatic colors has its red on the outside, and its blue, violet, or purple on the inside, with respect to the sun; such rings are generally formed when the sun shines through a thin cloud and may be seen if the sun is viewed through neutral-tinted glass or by reflection in water. Similar circles surrounding the shadow of the observer's head are called "anthelia," "aureolæ," "glories," or "fog-shadows," (German, *Gegensonne*, *Brockenspectra*).

18. ☽ LUNAR AUREOLA or CORONA—(German, *Mondhof*); circles surrounding the moon similar to the solar corona.

19. ⊕ SOLAR HALO—(German, *Sonnenring*); these are larger circles surrounding the sun whose sizes are quite definite, namely, about twenty-two degrees and about forty degrees radius from the sun; they are easily distinguishable from the coronæ by the fact that the colors are feebler and are so arranged that the red light is inside or nearest the sun and the blue light is outside; the greater part of the breadth of the halo is white. Complex combinations of halos, parhelia, horizontal circles, and vertical columns sometimes occur, all of which may be indicated in general by the symbol ⊕², where the figure ² indicates that the display is more brilliant than usual; a detailed statement of the radii or diameters of the rings and columns and of their arrangements should be given in the text.

20. ☽ LUNAR HALO—(German, *Mondring*); phenomena surrounding the moon similar to the solar halo.

21. ⌒ RAINBOW—Double rainbows and those with adjacent supernumerary bows may be indicated by ⌒².

22. ⌓ AURORAL LIGHTS—Namely, any display of the Aurora Borealis.

ABBREVIATIONS RECOMMENDED FOR USE.

TIME.

a. ante-meridian; p. post-meridian; n. noonday; m. midnight; h. hour. (The hours will be counted from 0 to 12, commencing with midnight.)

TEMPERATURE.

° degrees of temperature or of a circle; F. Fahrenheit; C. Centigrade; max., maximum of temperature, pressure, or other element; min., minimum of temperature, pressure, or other element.

LENGTHS.

mi. miles; ft. feet; in. inches; kil. kilometers; m. meters; cm. centimeters; mm. millimeters.

CLOUDS.

C. cirrus; KC. cirro-cumulus; CS. cirro-stratus; K. cumulus; KS. cumulo-stratus; S. stratus; Nim. nimbus.